FIG. 1

FIG. 2

FIG. 3

FIG. 4

350

357

CONTENT No.	TITLE	ARTIST'S NAME	CHANNEL	CONTENT URL
0001	Abc ‥ ffg	Csde ‥ fddd	‥	http://1.2.‥ (VIDEO CAPSULE URL)
0002				
0003	TERRESTRIAL CHANNEL LIST		1ch~12ch	http://1.2.‥ (CHANNEL LIST URL)
0004	SATELLITE BROADCAST CHANNEL LIST		BS1ch ~CSnnch	http://5.6.‥ (CHANNEL LIST URL)

FIG. 5

SERVER

S11:REQUEST ACQUISITION OF CONTENT INFORMATION

S12:CONTENT ATTRIBUTE INFORMATION

S14:TRANSMIT INFORMATION ABOUT DESIGNATION OF REPRODUCTION REQUESTED CONTENT

S15:TRANSMIT CONTENT

CLIENT

S13:DISPLAY CONTENT INFORMATION

S16:REPRODUCE CONTENT

FIG. 6

FIG. 7

481

ROOT

482

TUNER
CHANNEL LIST URL
PROTOCOL INFORMATION
(FUNCTION ID)

483

CHANNEL A

484

CHANNEL B

485

CHANNEL C

· · ·

FIG. 8A

```
<container id="ch-list" parentID="-1" restricted="1" ...>
<dc:title> TERRESTRIAL CHANNEL LIST </dc:title>
<upnp:class>object. container. function. avVideoTuner</upnp:class>
...
<av:allowedOperation>Play</av:allowedOperation>
<av:eventingURI>http://1.2.3.4:56000/SENA?id=live</av:eventingURI>
<res protocolInfo="http-get:*:video/mpeg:func-id=t01" av:codec="MPEG1V" ...>
http://1.2.3.4:5600/liveout Url
</res>
</container>
```
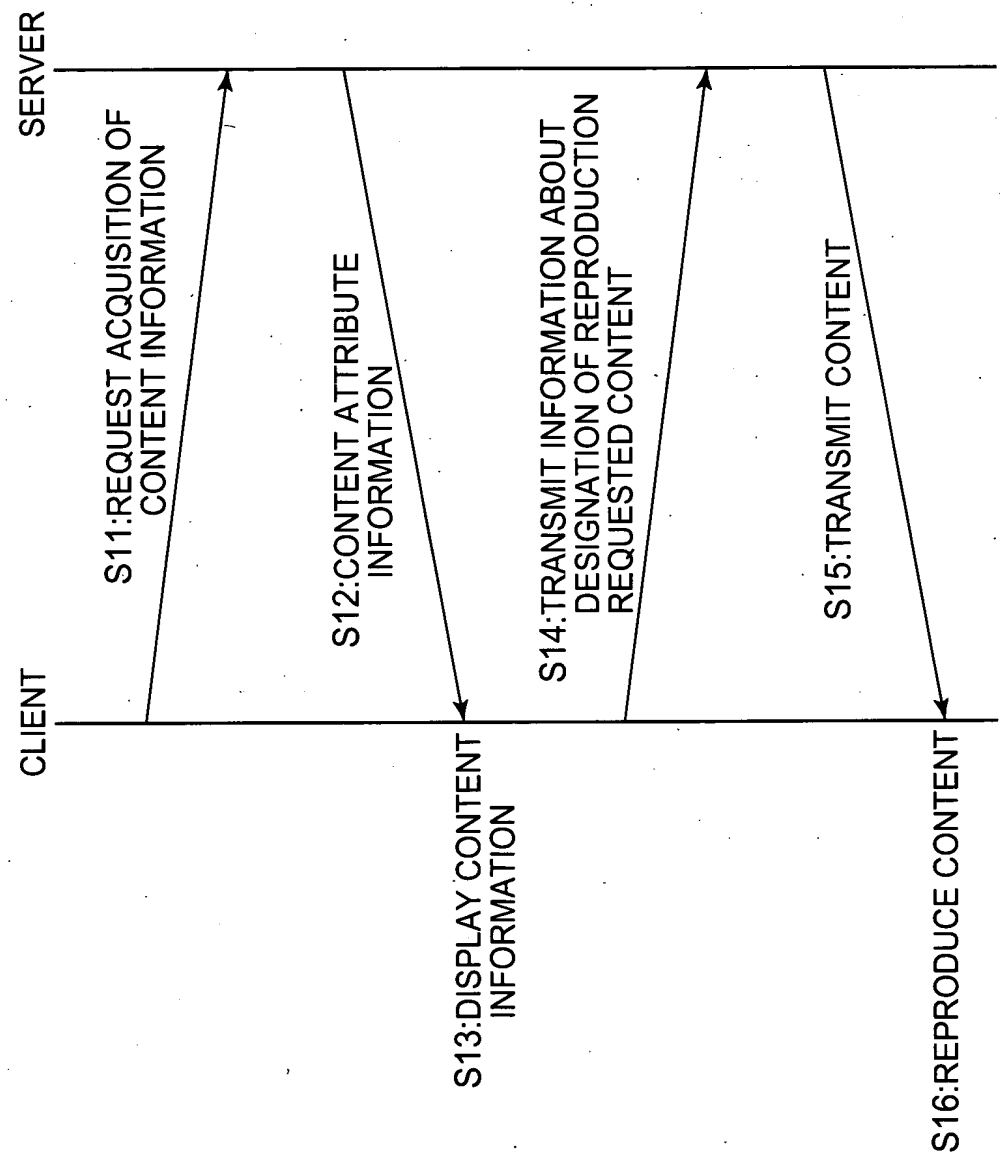
491

492

FIG. 8B

```
<item id="ch8" parentID"=dev0" restricted="1">
<dc:title>TOKYO TV </dc:title>
<upnp:class>object.item.videoItem.videoBroadcast.avChannel
</upnp:class>
<upnp:channelName>TOKYO TV<upnp:channelName>
<upnp:channelNr>8</upnp:channelNr>
...
</item>
```

FIG. 9

FIG. 10

CLIENT	CONNECTION ID	AVT INSTANCE ID	PROTOCOL INFORMATION
CLIENT A	123aac33	AB66ac33	MPEG
CLIENT B	253bed31	CD54ed22	internal:1.2.3.4:application /x-av-tuner-content:func-id=t01
. . .	. . .	. . .	. . .
CLIENT N	753bab55	ED78ab21	ATRAC

FIG. 11

SERVER

CONTENT DISTRIBUTION
CONTROL SECTION

CONTENT
MANAGEMENT SECTION

CLIENT

S201
Streaming Live Tuner Content
(LIVE CONTENT STREAMING)

SENA
(NOTIFY EVENT)

S202 AVT::Seek(AVTInstanceID, AnotherChannelNr)
(CHANNEL SWITCHING)

S203
Streaming Live Tuner Content
(LIVE CONTENT STREAMING)

SENA
(NOTIFY EVENT)

SAME HTTP
CONNECTION

FIG. 12

FIG. 13

FIG. 14

TUNER-TERRESTRIAL WAVES/BS

ChannelListURL1(func-id=a)
ChannelListURL2(func-id=b)

~601

602

603

TER/ TER/ TER/ TERRESTRIAL CHA CHA CHA CHANNEL

BS BS BS BS CH/ CH/ CH/ CHANNEL

FIG. 15

(a)

611

TUNER-TERRESTRIAL WAVES

ChannelListURL-Terrestrial1
(func-id=a)
ChannelListURL-Terrestrial2
(func-id=b)

612

TER TER TER TER
CHA CHA CHA CHANNEL
TERRESTRIAL
CHANNEL

(b)

621

TUNER-BS

ChannelListURL-BS1(func-id=a)
ChannelListURL-BS2(func-id=b)

622

BS BS BS BS
CHA CHA CHANNEL
CHANNEL

S04P0501

FIG. 16

(a)

TUNER-TERRESTRIAL WAVES
ChannelListURL-Terrestrial1
(func-id=a)
ChannelListURL-Terrestrial2
(func-id=b)

631

632

TER TER TER TERRESTRIAL
CHA CHA CHA CHANNEL

(b)

TUNER-BS
ChannelListURL-BS(func-id=a)

641

642

BS BS BS BS
CHA CHA CHA CHANNEL

FIG. 17

```
                    ┌──────────┐
                    │  START   │
                    └────┬─────┘
                         ▼
┌─────────────────────────────────────┐
│ CONTENT INFORMATION REQUESTING       │
│ PROCESS (TO CONTENT                  │── S501
│ MANAGEMENT SECTION)                  │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ RECEIVE CONTENT INFORMATION          │
│ (CHANNEL LIST URL, FUNCTION ID,      │── S502
│ CHANNEL INFORMATION)                 │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ PROTOCOL INFORMATION                 │
│ REQUESTING PROCESS (TO CONTENT       │── S503
│ DISTRIBUTION CONTROL SECTION)        │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ ACQUIRE PROTOCOL INFORMATION,        │── S504
│ FUNCTION ID                          │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ ACQUIRE CONNECTION INFORMATION       │── S505
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ REQUEST CONNECTION PREPARATION       │
│ WHEREIN TUNER PROTOCOL               │── S506
│ INFORMATION IS STORED (TO CMS)       │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ RECEIVE AVT INSTANCE ID AND          │── S507
│ CONNECTION ID                        │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ SET URI TO AVT INSTANCE              │── S508
│ (AVT INSTANCE ID, CHANNEL LIST URL)  │
└──────────────────┬──────────────────┘
                   ▼
┌─────────────────────────────────────┐
│ TRANSMIT CONTROL REQUEST TO          │── S509
│ AVT INSTANCE                         │
└──────────────────┬──────────────────┘
                   ▼
         < SWITCH CHANNELS? >── YES ──┐           S511
              S510                    │  ┌──────────────────────────────┐
               │ NO        S512       └─▶│ TRANSMIT CHANNEL SWITCHING   │
               ▼                         │ REQUEST TO AVT INSTANCE      │
    NO < COMPLETE CONNECTION? >◄─────────┴──────────────────────────────┘
               │ YES
               ▼
┌─────────────────────────────────────┐
│ TRANSMIT CONNECTION COMPLETE         │── S513
│ REQUEST TO CMS (CONNECTION ID)       │
└──────────────────┬──────────────────┘
                   ▼
              ┌──────────┐
              │   END    │
              └──────────┘
```

FIG. 18

START

↓

RECEIVE CONTENT INFORMATION REQUEST(DCS) — S601

↓

TRANSMIT CONTENT INFORMATION (CHANNEL LIST URL, FUNCTION ID, CHANNEL INFORMATION) — S602

↓

RECEIVE PROTOCOL INFORMATION REQUEST (CONTENT DISTRIBUTION CONTROL SECTION) — S603

↓

TRANSMIT PROTOCOL INFORMATION, FUNCTION ID — S604

↓

RECEIVE CONNECTION INFORMATION REQUEST,INFORMATION PROVIDING PROCESS — S605

↓

RECEIVE CONNECTION PREPARATION REQUEST WHEREIN TUNER PROTOCOL INFORMATION IS STORED(CMS) — S606

↓

ASSIGN AVT INSTANCE, BIND IT TO CONNECTION ID(REGISTER IN CONNECTION MANAGEMENT TABLE) — S607

↓

TRANSMIT AVT INSTANCE ID AND CONNECTION ID — S608

↓

RECEIVE REQUEST FOR SETTING URI TO AVT INSTANCE (AVT INSTANCE ID, CHANNEL LIST URL) — S609

↓

SET URI TO AVT INSTANCE — S610

↓

RECEIVE CONTROL REQUEST (AVT INSTANCE) — S611

↓

TUNER CONTROL BY AVT INSTANCE — S612

↓

CHANNEL SWITCHING REQUEST RECEIVED? — S613

— YES → CHANNEL SWITCHING THROUGH TUNER CONTROL BY AVT INSTANCE — S614

— NO ↓ S615

CONNECTION COMPLETE REQUEST RECEIVED?

— NO →

— YES ↓

BREAK CONNECTION, DELETE ENTRY FROM CONNECTION MANAGEMENT TABLE — S616

↓

END

FIG. 19

S04P0501

FIG. 20